



SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

# EFC4606 — General-Purpose Switching Device Applications

## Features

- 2.5V drive.
- Best suited for LiB charging and discharging switch.
- Common-drain type.

## Specifications

### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings		Unit
Source-to-Source Voltage	V <sub>SSS</sub>			24	V
Gate-to-Source Voltage	V <sub>GSS</sub>			±12	V
Source Current (DC)	I <sub>S</sub>			6	A
Source Current (Pulse)	I <sub>SP</sub>	PW≤100μs, duty cycle≤1%		60	A
Total Dissipation	P <sub>T</sub>	When mounted on ceramic substrate (5000mm <sup>2</sup> ×0.8mm)		1.6	W
Channel Temperature	T <sub>ch</sub>			150	°C
Storage Temperature	T <sub>stg</sub>			-55 to +150	°C

### Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit	
			min	typ	max		
Source-to-Source Breakdown Voltage	V(BR)SSS	I <sub>S</sub> =1mA, V <sub>GS</sub> =0V	Test Circuit 1	24		V	
Zero-Gate Voltage Source Current	I <sub>SSS</sub>	V <sub>SS</sub> =20V, V <sub>GS</sub> =0V	Test Circuit 1		1	μA	
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>SS</sub> =0V	Test Circuit 2		±10	μA	
Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>SS</sub> =10V, I <sub>S</sub> =1mA	Test Circuit 3	0.5		1.3	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>SS</sub> =10V, I <sub>S</sub> =3A	Test Circuit 4	5.3	8.9	S	
Static Source-to-Source On-State Resistance	R <sub>SS(on)1</sub>	I <sub>S</sub> =3A, V <sub>GS</sub> =4.5V	Test Circuit 5	22	30	38	mΩ
	R <sub>SS(on)2</sub>	I <sub>S</sub> =3A, V <sub>GS</sub> =4.0V	Test Circuit 5	23	32	41	mΩ
	R <sub>SS(on)3</sub>	I <sub>S</sub> =1.5A, V <sub>GS</sub> =3.1V	Test Circuit 5	26	35	45	mΩ
	R <sub>SS(on)4</sub>	I <sub>S</sub> =1.5A, V <sub>GS</sub> =2.5V	Test Circuit 5	30.5	41	57.5	mΩ

Marking : FF

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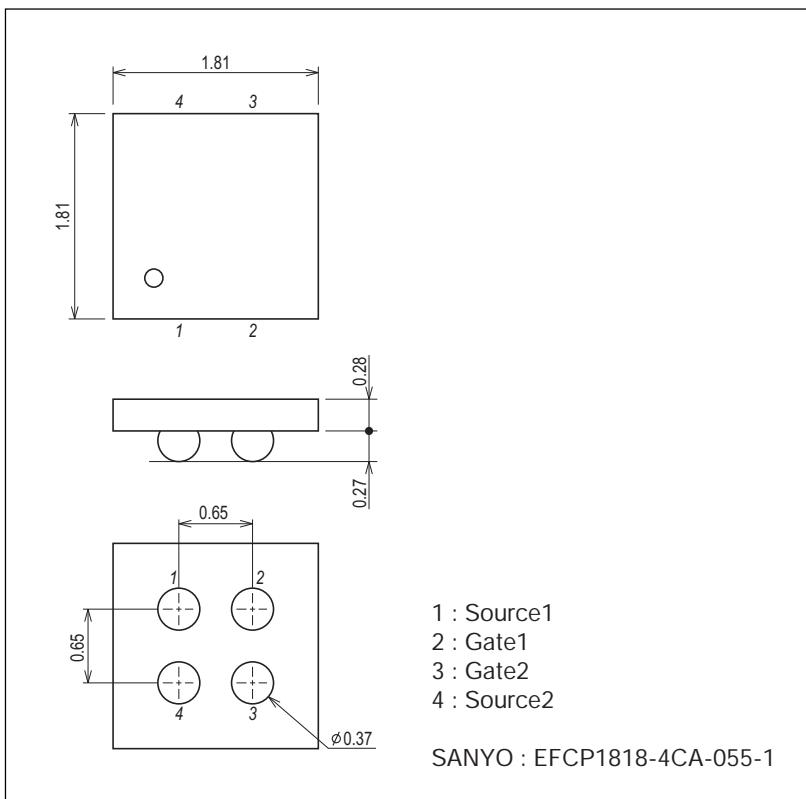
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Parameter	Symbol	Conditions	Ratings			Unit	
			min	typ	max		
Input Capacitance	$C_{iss}$	$V_{SS}=10V, f=1MHz$	Test Circuit 8		1050	pF	
Output Capacitance	$C_{oss}$	$V_{SS}=10V, f=1MHz$	Test Circuit 8		170	pF	
Reverse Transfer Capacitance	$C_{rss}$	$V_{SS}=10V, f=1MHz$	Test Circuit 8		124	pF	
Turn-ON Delay Time	$t_{d(on)}$	See specified Test Circuit.	Test Circuit 7		22	ns	
Rise Time	$t_r$	See specified Test Circuit.	Test Circuit 7		92	ns	
Turn-OFF Delay Time	$t_{d(off)}$	See specified Test Circuit.	Test Circuit 7		205	ns	
Fall Time	$t_f$	See specified Test Circuit.	Test Circuit 7		141	ns	
Total Gate Charge	$Q_g$	$V_{SS}=10V, V_{GS}=4.5V, I_S=6A$			13	nC	
Forward Source-to-Source Voltage	$V_{F(S-S)}$	$I_S=6A, V_{GS}=0V$	Test Circuit 6		1	1.2	V

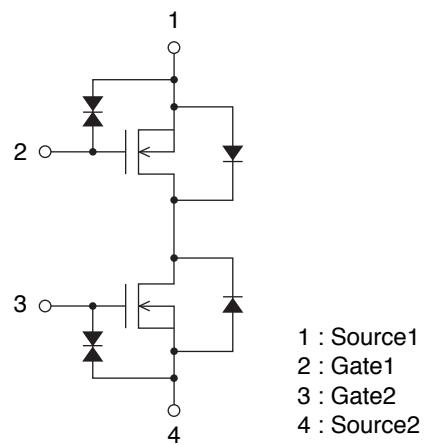
## Package Dimensions

unit : mm (typ)

7059-001



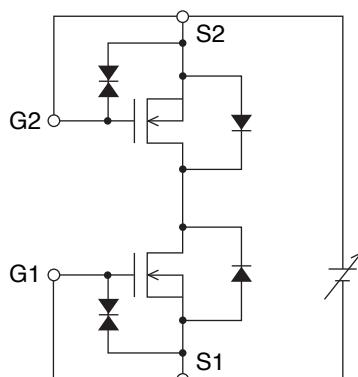
## Electrical Connection



## Test Circuits are example of measuring FET1 side

Test Circuit 1

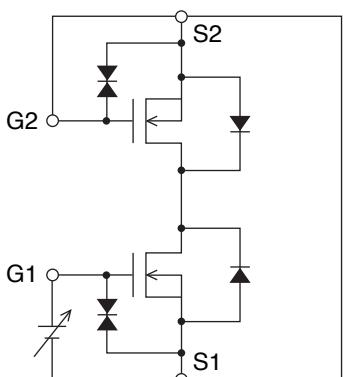
$V_{SSS}$  /  $I_{SSS}$



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Test Circuit 2

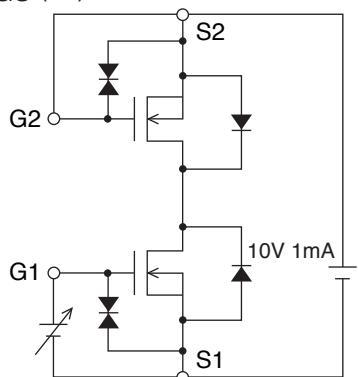
$|I_{GSS} (+) / (-)$



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Test Circuit 3

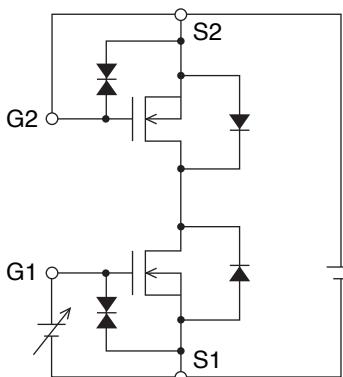
$V_{GS}$  (off)



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Test Circuit 4

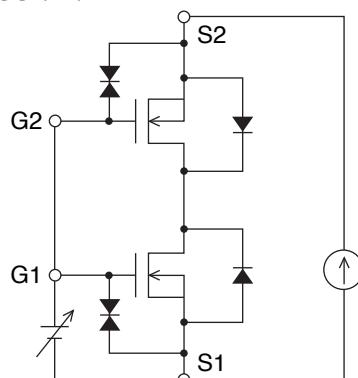
$|y_{fs}|$



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Test Circuit 5

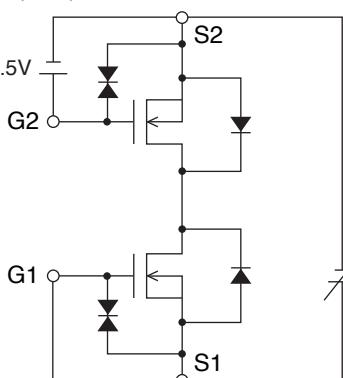
$R_{SS}$  (on)



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Test Circuit 6

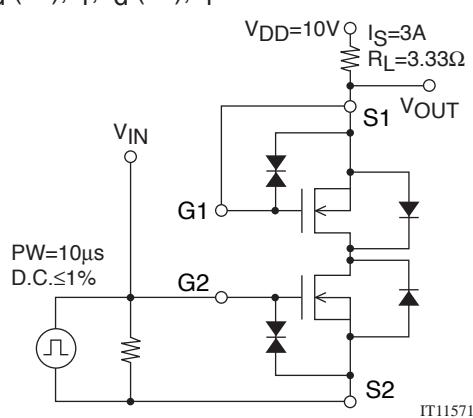
$V_F$  (S-S)



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Test Circuit 7

$t_d$  (on),  $t_r$ ,  $t_d$  (off),  $t_f$

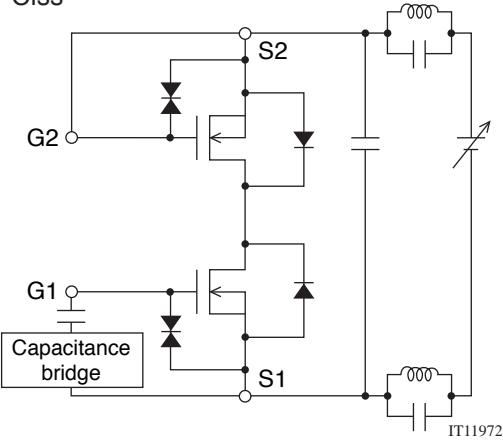


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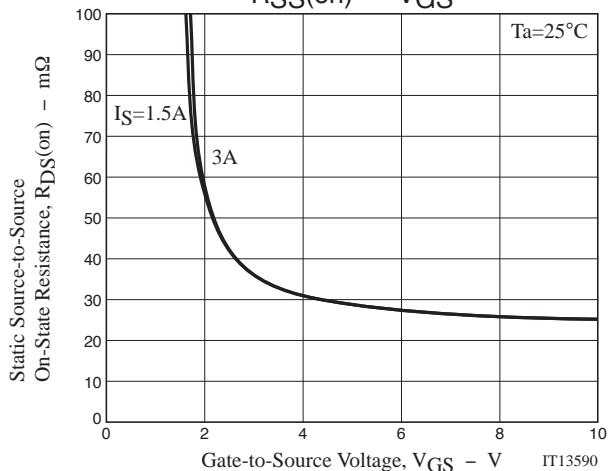
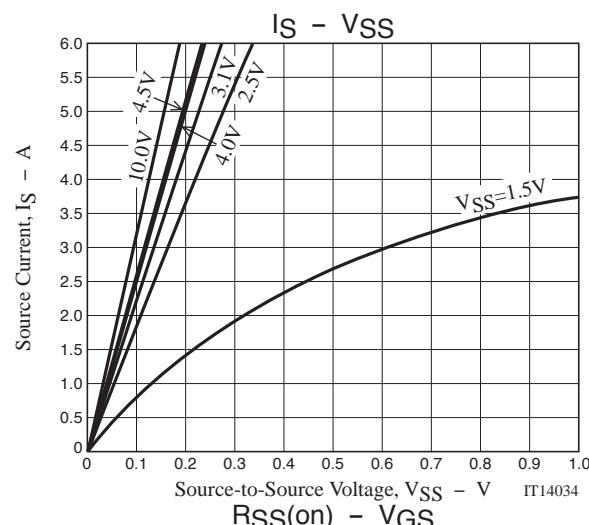
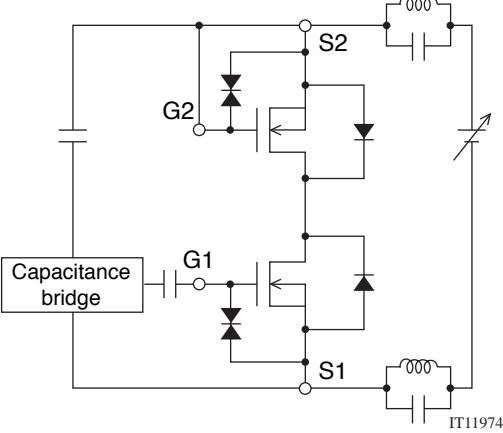
\* Note: Connect the measurement terminal reversely if you want to measure the FET2 side.

## Test Circuit 8

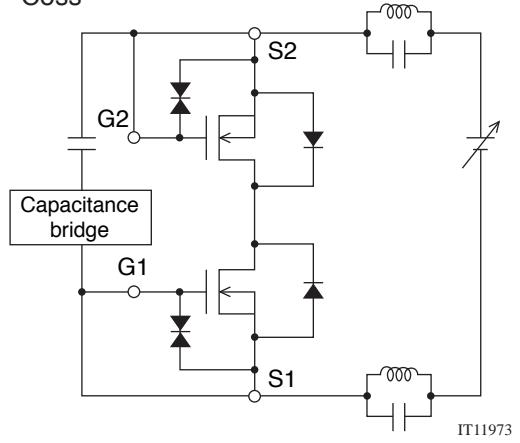
Ciss



Crss

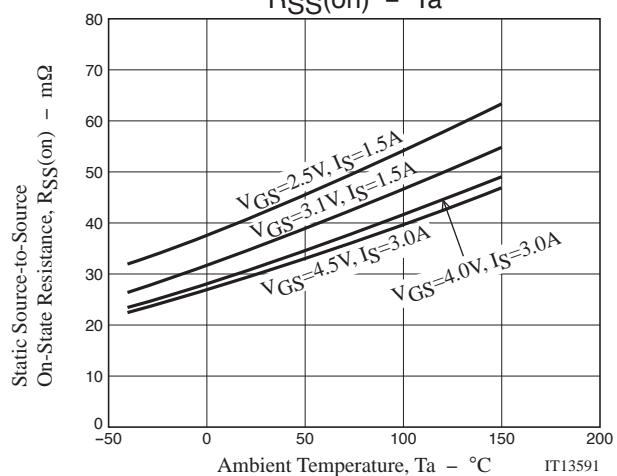
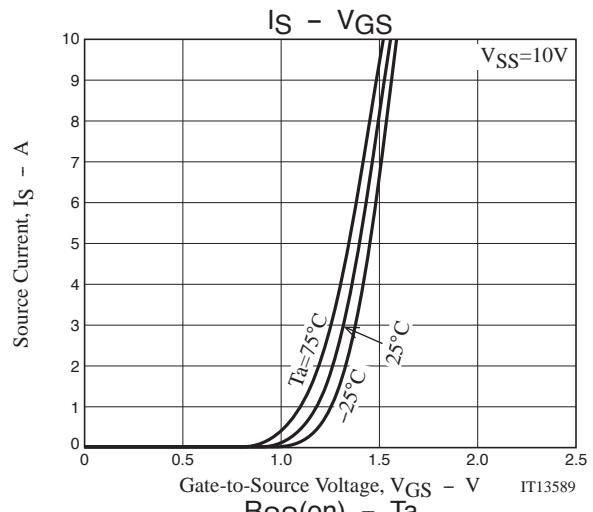


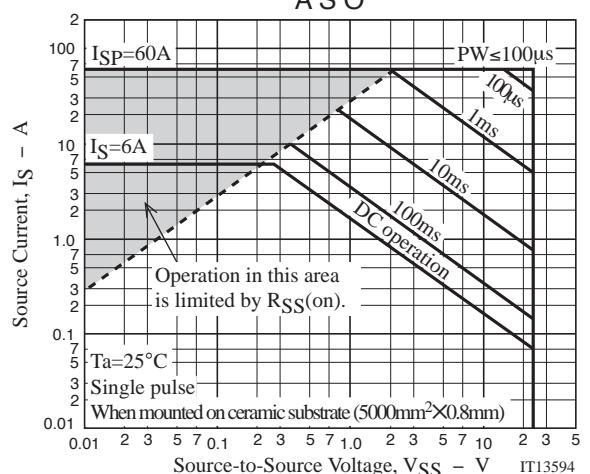
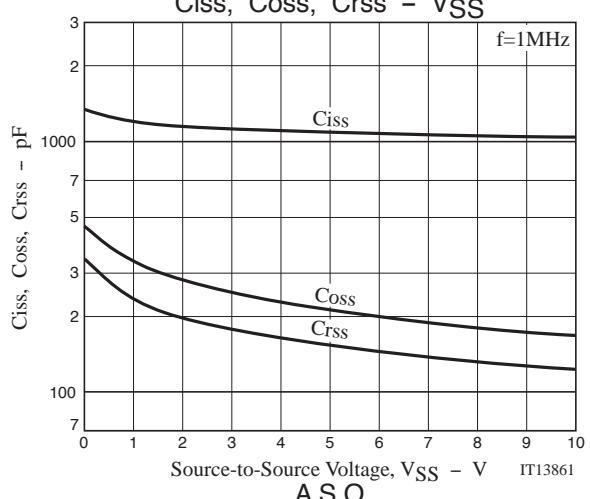
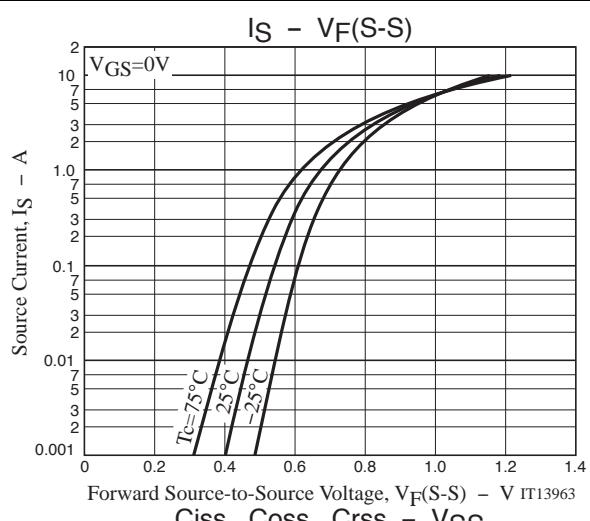
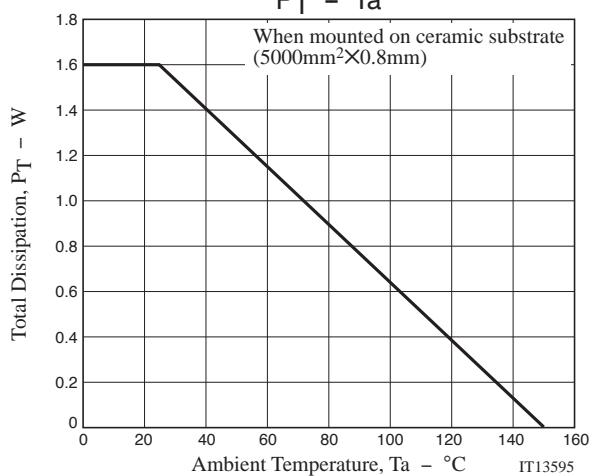
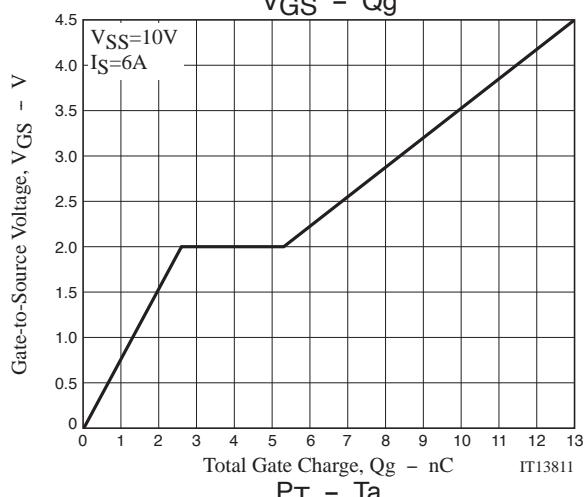
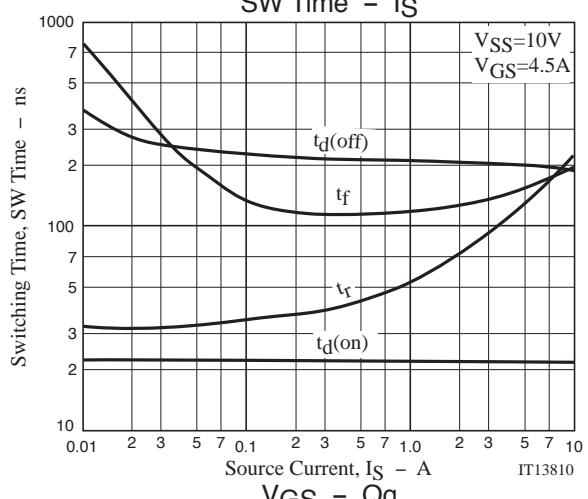
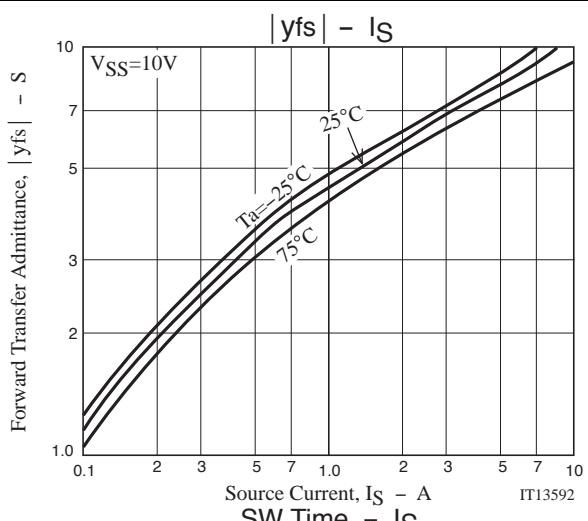
Coss



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\* Note: Connect the measurement terminal reversely if you want to measure the FET2 side.





Note on usage : Since the EFC4606 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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